

Branch Technical Position HICB-2

Guidance on Requirements of Motor-Operated Valves in the Emergency Core Cooling System Accumulator Lines

A. Background

For many postulated loss-of-coolant accidents, the performance of the emergency core cooling system (ECCS) in pressurized water reactor plants depends upon proper functioning of the safety injection tanks (also referred to as "accumulators" or "flooding tanks" in some applications). In these plants, a motor-operated isolation valve (MOIV) and two check valves are provided in series between each safety injection tank and the reactor coolant (primary) system.

The MOIVs must be considered to be "operating bypasses" because, when closed, they prevent the safety injection tanks from performing the intended protective function. ANSI/IEEE Std 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," has a requirement for "operating bypasses" which states that the bypasses of a protective function will be removed automatically whenever permissive conditions are not met. IEEE Std 603, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," contains a similar requirement. This branch technical position provides specific guidance in meeting the intent of ANSI/IEEE Std 279 or IEEE Std 603 for safety injection tank MOIVs.

It should be noted that BTP ICSB-18 (PSB), "Application of the Single-Failure Criterion to Manually Controlled Electrically Operated Valves," also applies to these isolation valves and should be used in conjunction with this position.

B. Branch Technical Position

The following features should be incorporated into the design of MOIV systems for safety injection tanks to meet the intent of ANSI/IEEE Std 279:

1. Automatic opening of the valves when either primary coolant system pressure exceeds a preselected value (to be specified in the technical specifications), or a safety injection signal is present. Both primary coolant system pressure and safety injection signals should be provided to the valve operator.
2. Visual indication in the control room of the open or closed status of the valve.
3. Bypassed and inoperable status indication in accordance to Regulatory Guide 1.47, "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety System."
4. Utilization of a safety injection signal to remove automatically (override) any bypass feature that may be provided to allow an isolation valve to be closed for short periods of time when the reactor coolant system is at pressure (in accordance with provisions of the technical specifications).

C. References

ANSI/IEEE Std 279-1971. "Criteria for Protection Systems for Nuclear Power Generating Stations."

Regulatory Guide 1.47. "Bypassed and Inoperable Status Indication for Nuclear Power Plant Safety Systems." Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, 1973.

IEEE Std 603-1991. "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations."